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Pride and shame: Key components of a culturally universal status management system

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ABSTRACT

We apply recent adaptationist theories about the emotions “pride” and “shame” to the domain of hierarchical status and test the hypothesis that pride and shame are distinct components of a culturally universal status-management system. Using an international dataset containing ratings of the status impacts of 240 personal characteristics within 14 nations ($N = 2751$), we found that (i) the status impacts of personal characteristics were strongly intercorrelated across nations ($r_s = 0.79\text{--}0.98$); (ii) American's ($N = 222$) forecasts of the pride or shame they would experience if they exhibited those same personal characteristics closely tracked the status impacts across nations ($|r_s| = 0.74\text{--}0.98$); and (iii) pride differentially tracked *status gains*, while shame differentially tracked *status losses*. These findings provide strong supporting evidence for the existence of a universal grammar of status criteria, and suggest that pride and shame are key components of a culturally universal status management system.

1. Introduction

Emotions are hypothesized to be neurocomputational adaptations designed by natural selection to coordinate the operations of multiple systems within the organism (e.g., perceptual, metabolic, and motivational systems) and to orchestrate system-wide functional responses to specific ancestrally-recurrent adaptive problems (Al-Shawaf, Conroy-Beam, Asao, & Buss, 2016; Cosmides & Tooby, 2000; Nesse, 1990; Tracy, 2014). This framework has been fruitfully applied to develop theories about the evolved functions and computational architectures of emotional programs labeled “pride” (e.g., Sznycer et al., 2017; Tracy, Shariff, & Cheng, 2010) and “shame” (e.g., Gilbert, 2000; Sznycer et al., 2016). According to these theories, pride and shame each evolved to solve distinct problems related to managing one's social value in the minds of others. Pride functions to promote a person's socially-valued traits and achievements to upwardly recalibrate others' internal valuation of the person experiencing and expressing pride. Shame functions to prevent the spread of socially-disvalued information about the self and to mitigate the costs of any resultant social devaluation.

Compelling support for these theories comes from large cross-cultural studies of industrialized and small-scale societies (Sznycer et al., 2017, 2016; Sznycer et al., 2018; Sznycer et al., 2018). Taken together, these studies demonstrated that the degree to which specific personal characteristics were forecasted to elicit pride or shame in subjects

closely (and uniquely) tracked the degree to which those same characteristics were independently judged to be socially positive (for pride) or negative (for shame). These findings convincingly support the most general, first-order, predictions from the focal adaptationist theories about the activating conditions of these emotions.

The current research extends these previous findings in two primary ways. First, we evaluate the hypothesis that pride and shame function as components of a culturally-universal system for managing one's *hierarchical status*: a more specific dimension of social value. Second, we test the hypothesis that pride and shame each exhibit distinct nonlinear relationships with the status gain-status loss continuum, such that pride differentially tracks status increases, whereas shame differentially tracks status decreases.

1.1. Adaptive problems posed by living in hierarchical groups

Converging evidence from comparative ecology, anthropology, and psychology indicate that ancestral humans lived in hierarchically organized social groups of varying steepness and complexity (Anderson, Hildreth, & Howland, 2015; Boehm, 2012). Across the animal kingdom, hierarchies define individuals' relative access to contested resources and minimize costly conflict and negotiation (Archer, 1988). Among non-human and human primates, relative hierarchical status within communities positively predicts a wide range of fitness-relevant

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outcomes, including access to territory, desirable mates, and reproductive success (Chagnon, 1988; von Rueden, Gurven, & Kaplan, 2008; von Rueden & Jaeggi, 2016). Navigating hierarchical dynamics and competing for relative status therefore posed a range of adaptive problems for ancestral humans (Henrich & Gil-White, 2001; Kyl-Heku & Buss, 1996).

Although humans may have inherited rudimentary forms hierarchical social organization from ancestral apes, the logic of human status acquisition has been modified substantially since our lineage split with that of chimpanzees. Among non-human apes, relative status is determined primarily by aggressive formidability, such that the highest-ranking individuals will typically be those who can elicit deference from the largest number of others by the threat of aggression (De Waal, 1982; van Schaik, 2016). Along the human lineage, the ability to acquire and maintain status purely by threatening to inflict costs was greatly curtailed as we evolved elaborated capacities of n-person cooperation (Gintis et al., 2015; Tooby, Cosmides, & Price, 2006; von Rueden & Van Vugt, 2015). Humans form collective actions and coalitions with relative ease, which empowers community members to collectively prevent aggressively self-interested individuals from usurping undeserved resources and status (Tooby et al., 2006). Consequently, human status is acquired within the context of a social exchange contract of service-for-prestige, which stipulates that group members will allocate greater status to individuals to the extent that they generate benefits for the community and its members (Lukaszewski, Simmons, Anderson, & Roney, 2016; Patton, 2000; Price & Van Vugt, 2014). If high-ranking individuals fail to generate sufficient benefits to deserve their status, other group members can easily depose them through coalitional action (Gintis et al., 2015). Thus, to an unprecedented degree among the apes, the acquisition and maintenance of status by ancestral humans was dependent upon the extent to which an individual's perceived contributions to a community were intrinsically valued by others. Human status can therefore be viewed as a special case of social value: possessing socially valued qualities is necessary, but not sufficient, for the development and prolonged maintenance of hierarchical status (we further elaborate on the distinctions between hierarchical status and other forms of social value in the discussion).

A task analysis suggests that an evolved status-management system in humans should be equipped with specific design features. First, it should possess a universal grammar of *status criteria* designed to compute the impact of specific personal characteristics (e.g., exhibiting certain acts, possessing certain traits) on status in n-person groups (Buss, 2001; Gilbert, 2000; Kyl-Heku & Buss, 1996). Second, it should reference this grammar of status criteria to strategically manage one's own status in the minds of others. It is this latter adaptive problem—the management of status—to which pride and shame are hypothesized to be evolved solutions.

1.2. Pride and shame as components of a culturally universal status management system

Much research has documented that pride and shame respectively solve challenges associated with increases and decreases in hierarchical status.

1.2.1. Pride solves adaptive problems of status gain

To acquire and maintain the level of status to which an individual is entitled based on one's fulfillment of status criteria, the status management system must (1) encode the occurrence of potentially status-increasing events, (2) broadcast this information to others in order to upwardly recalibrate the level of status they allocate to the self, and (3) upwardly recalibrate one's own internal estimate of the status to which the self is entitled.

Ample evidence suggests that pride effectively manages these challenges. The pleasurable experience of pride motivates individuals

to act in ways that make them feel pride (Verbeke, Belschak, & Bagozzi, 2004; Tracy et al., 2010, Williams & DeSteno, 2008, 2009). Pride is often expressed nonverbally by a universal postural display—an upward-tilted face and expanded posture (Tracy & Robins, 2004)—which is exhibited even by congenitally blind athletes (Tracy & Matsumoto, 2008). This pride display is recognized by children as young as age three (Tracy, Robins, & Lagattuta, 2005) and is reliably identified cross-culturally (Tracy & Robins, 2008; Tracy, Shariff, Zhao, & Henrich, 2013), implying the existence of mechanisms designed to interpret such a signal. Moreover, inferences of status are made automatically by receivers of this pride display (Shariff & Tracy, 2009; Shariff, Tracy, & Markusoff, 2012)—demonstrating that pride displays signal status and social value. Finally, pride is positively related to self-esteem (Tracy, Cheng, Robins, & Trzesniewski, 2009), which is likely yoked to self-perceptions of status (Gilbert, 2000; Leary, Tambor, Terdal, & Downs, 1995; Mahadevan, Gregg, & Sedikides, 2018; Tracy et al., 2010), suggesting that pride is involved in upward-calibration of self-perceived status. Pride therefore addresses the main adaptive challenges of status gains: motivating socially valued behavior, signaling status gains to others, and upwardly-calibrating self-perceptions of social value and status.

1.2.2. Shame solves adaptive problems of status loss

To mitigate the problems status loss, the status management system must (1) encode the occurrence or revelation of potentially status-decreasing events, and either (2a) prevent others from encoding this information, or, (2b) if already encoded by others, mitigate the potential costs of status loss (e.g., by hiding from view, appeasing others, or bargaining aggressively). If status has been downwardly recalibrated in the minds of others, the system must (3) downwardly recalibrate the internal estimate of the status to which the self is entitled.

A substantial body of evidence suggests that shame efficiently solves these problems. Shame is triggered in response to social devaluation, even when the social devaluation is not the result of one's own wrongdoing (Robertson, Sznycer, Delton, Tooby, & Cosmides, 2018). The experience of shame varies somewhat across cultures but is universally painful and motivates people to avoid its elicitors (Fessler, 2007; Gilbert, 2000; Martens, Tracy, & Shariff, 2012). Crucially, the cross-culturally recognized shame display—characterized by a downward gaze and slouched posture—is interpreted as a cue to low status, even when in the presence of conflicting contextual information (Azim, Shariff, & Markusoff, 2012), and conveys remorse and willingness to appease observers, which elicits forgiveness and reconciliation (Keltner & Harker, 1998; Keltner, Young, & Buswell, 1997; Keltner, 1995). Consistent with shame's proposed role in downwardly recalibrating self-perceived status, the experience of shame is strongly associated with feelings of inferiority, social anxiety, and submissiveness (Gilbert, 2000; Tangney, Miller, Flicker, & Barlow, 1996). Shame therefore solves the main adaptive problems of status loss: deterring devalued behavior, limiting the impact of status losses, and downwardly-calibrating self-perceptions of social value and status.

1.3. Do pride and shame exhibit nonlinear relationships with the status gain-loss continuum?

Theoretical analyses of pride and shame often view pride and shame as poles along a unitary emotional continuum (e.g., TenHouten, 2017; Weisfeld & Dillon, 2012). Rather than distinct emotional programs, pride and shame are viewed as the folk-lexical descriptions of outputs on the opposite ends of a more domain-general emotional program. However, the adaptationist theories guiding the current investigation hypothesize that these emotions are at least partly distinct, domain-specific components of a broader system for managing one's social value in the minds of others. In the status domain, each emotion is hypothesized to solve a qualitatively distinct adaptive problem: Pride is hypothesized to track potential or actualized status gain, whereas

shame is hypothesized to track potential or actualized status loss.

It follows that pride and shame will exhibit differential nonlinear relationships with the status gain-loss continuum, such that pride tracks status-increasing events more strongly than shame, whereas shame tracks status-decreasing events more strongly than pride. Moreover, the parameters of the pride and shame response should not be simple inverses of one another, if they are distinct systems. Such distinct nonlinearities would constitute necessary, but not sufficient, evidence to support the domain-specificity of the pride and shame programs.

Previous studies have clearly established that the intensity of pride's activation universally tracks forecasted increases in general social value (Sznycer et al., 2017; Sznycer, Xygalatas, Agey, et al., 2018), whereas the intensity of shame's activation tracks forecasted devaluation (Sznycer et al., 2016; Sznycer, Xygalatas, Alami, et al., 2018). However, no previous studies have examined (a) the activation of pride or shame across an entire continuum running from increased-to-decreased social value, or more generally (b) whether these emotions are activated in close proportion to gains or losses in hierarchical status.

1.4. The current study

In the current study, we conceptually replicate and extend previous research by testing whether pride and shame are activated in direct proportion to status gains and losses, and explicitly testing whether pride and shame function as separate components of a species-typical status management system. We do so by (1) leveraging a large, international dataset containing detailed information from independent samples across 14 nations about the extent to which 240 specific personal characteristics (acts, traits, and events) increase or decrease a person's status in the minds of others, and (2) having separate samples of Americans assess how much pride and shame would be activated in response to exhibiting each personal characteristic. These data allow broader generalization to the full breadth of personal characteristics that could affect status in everyday life, and they permit the first explicit test of whether forecasted pride and shame intensities closely and non-linearly track forecasted gains and losses of status.

Using these data, we provide empirical tests of several basic predictions (Ps) derived from the hypotheses outlined above, which we preregistered in advance of data collection (see https://osf.io/nse8r/?view_only=7eadfbc786f4390830a9a30c5e188ec):

P1. Status impacts—the extent to which specific acts and traits are judged to increase or decrease status—will exhibit substantial cross-cultural consistency across 14 nations.¹

P2. Americans' ratings of forecasted pride will positively track status impacts, such that pride is elicited most intensely by status-increasing characteristics. This will hold when using status impact ratings from any of the 14 nations.

P3. Americans' ratings of forecasted shame will negatively track status impacts, such that shame is elicited most intensely by status-decreasing characteristics. This will hold when using status impact ratings from any of the 14 nations.

P4. Pride and shame will exhibit differential non-linear associations with status criteria ratings, such that pride tracks status-increasing characteristics more closely than shame, whereas shame tracks status-decreasing characteristics more closely than pride. This will hold when using status impact ratings from any of the 14 nations.

¹ Due to researcher error, this hypothesis was not explicitly stated in our preregistration, but it is implied by the preregistered predictions that follow.

2. Materials and methods

2.1. Participants

A total of 2973 (1593 women) respondents from 14 countries (Brazil, China, Colombia, Eritrea, Estonia, Germany, Guam, Japan, South Korea, Poland, Romania, Russia, USA, and Zimbabwe) participated in this research. We provide more information on the task-specific sample characteristics within the respective procedural sections.

2.2. Materials and procedure

2.2.1. Status impact ratings

To manipulate status gains and losses, we used a previously unpublished dataset collected between 1994 and 2011 by DMB and cross-cultural collaborators that contains ratings of 240 items describing status-affecting acts, characteristics (e.g., “dating someone who is physically attractive”, “being an exceptional leader”, “being known as a thief”; See the SOM-R for the full list of items). The items were generated in an act nomination procedure where two samples of American college students nominated acts, characteristics, or events that could either increase or decrease someone's status and reputation. We culled the nominations by removing redundant items and correcting grammar but erred on the side of over-inclusion, retaining all acts and events that had even partial distinctiveness; this process resulted in 175 status-affecting items. Additional items were added over time by cross-cultural collaborators who collected data. Respondents ($N = 2751$; 1487 women) from each of the 14 countries rated the unique effect that the items would have on both men's and women's status according to the prompt:

“In this study, we are interested in the effects of certain events and behaviors on the status and reputation of the persons who perform these acts or experience these events. Some will be likely to increase a person's status and reputation in the eyes of their peer group; others will be likely to decrease their status and reputation in the eyes of their peer group.

Please use the scale below [$-4 =$ greatly decrease status and reputation; $0 =$ no effect on status and reputation; $+4 =$ greatly increase status and reputation] to rate the likely effects of each act or event on status and reputation (1) for males (event happens to or is performed by a man) and (2) for females (event happens to or is performed by a women). For some events and behaviors, the effects on status and reputation may be the same for men and women; for others, the effects on status and reputation may be different for men and women.”

The per-country sample sizes range from $N = 84$ (Poland) to $N = 505$ (USA) and roughly equal numbers of men and women participated in each country (mean age = 22.88; $SD = 4.90$). Because data collection for the status-affecting items took place over the span of a nearly two decades and collaborators added more items to the list over time, it was not possible to collect ratings for every item in all countries. However, all items that were available at the time of data collection within a country were rated by all participants sampled within that country. The total number of items rated by participants within a given country range from 169 to 240 items.

2.2.2. Ratings of pride and shame

In two additional studies, 222 American Mturk workers rated their forecasted levels of either pride or shame in response to each of the 240 status-affecting items (“How much [pride/shame] would you personally feel if this was your reputation within your social group?”; $0 =$ none, $3 =$ a moderate amount, $6 =$ a lot). We prompted participants to think about “reputation” because it is closely connected to status (i.e., changes in reputation are associated with changes in status), and does not make the research question as explicit to participants, which helps

to avoid demand characteristics.

Each participant rated the items in a randomized order. Participants also completed several other measures (e.g. personality inventory, religiosity measure) as part of a separate study that will not be reported here. We excluded 12 respondents who failed to correctly answer at least three out of five attention check questions, which reduced our total condition-specific sample sizes to 106 participants in the pride condition (53 women) and 105 in the shame condition (52 women). The ages of participants in this final sample ranged from 20 to 84 ($M = 34.52$; $SD = 11.04$).

We based our sample size on heuristics for mixed-models provided in Westfall, Kenny, and Judd (2014). Their simulations demonstrate that power to detect a small effect reaches 80% with 100 participants and 240 stimuli. We expected that most of our effects would be larger than $d = 0.20$ because previous research on the relationship between social emotions and social valuations found large effects (e.g., Sznycer et al., 2017, 2016), so this sample size of roughly 100 participants per emotion is more than adequate for accurately characterizing the response parameters of pride and shame.

3. Results

3.1. Are status impacts consistent across cultures?

We aggregated men's and women's ratings of the status-impact of each item within each country on men and women (ICCs ranged from 0.69 to 0.97) separately to estimate the average impact of a given item on a man and the impact on a woman within each country. We chose to aggregate both men's and women's ratings of the status impacts for each sex because status is a combination of both women's and men's status allocation, not only what men think of men and women think of women. Cross national correlations of mean status impacts for each item ranged from 0.79 to 0.98 ($M_r = .89$) for men's status, and from 0.82 to 0.98 ($M_r = .90$) for women's status. Correlations between the mean item-impacts on men's and women's status within each country ranged from 0.86 to 0.96 ($M_r = .92$). Table 1 presents all between-country correlations of status impact ratings for men and women.

Table 1
Cross-national pairwise correlations of sex-specific average status impact ratings.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| 1. Brazil | 0.92 | 0.93 | 0.88 | 0.90 | 0.90 | 0.91 | 0.94 | 0.86 | 0.90 | 0.90 | 0.91 | 0.91 | 0.94 | 0.90 |
| 2. Colombia | 0.93 | 0.89 | 0.88 | 0.88 | 0.92 | 0.93 | 0.96 | 0.85 | 0.89 | 0.90 | 0.95 | 0.92 | 0.96 | 0.91 |
| 3. China | 0.86 | 0.84 | 0.91 | 0.87 | 0.85 | 0.86 | 0.90 | 0.87 | 0.90 | 0.91 | 0.89 | 0.86 | 0.88 | 0.90 |
| 4. Eritrea | 0.88 | 0.90 | 0.86 | 0.95 | 0.85 | 0.87 | 0.90 | 0.89 | 0.85 | 0.90 | 0.86 | 0.86 | 0.89 | 0.94 |
| 5. Estonia | 0.92 | 0.90 | 0.86 | 0.88 | 0.91 | 0.92 | 0.93 | 0.86 | 0.89 | 0.89 | 0.92 | 0.94 | 0.93 | 0.88 |
| 6. Germany | 0.93 | 0.91 | 0.87 | 0.88 | 0.93 | 0.92 | 0.93 | 0.82 | 0.89 | 0.89 | 0.95 | 0.90 | 0.94 | 0.88 |
| 7. Guam | 0.95 | 0.93 | 0.86 | 0.89 | 0.93 | 0.91 | 0.86 | 0.88 | 0.92 | 0.92 | 0.93 | 0.93 | 0.98 | 0.94 |
| 8. Romania | 0.83 | 0.84 | 0.81 | 0.88 | 0.84 | 0.79 | 0.82 | 0.96 | 0.86 | 0.87 | 0.84 | 0.87 | 0.86 | 0.90 |
| 9. Japan | 0.88 | 0.88 | 0.89 | 0.85 | 0.89 | 0.90 | 0.88 | 0.86 | 0.95 | 0.92 | 0.90 | 0.90 | 0.91 | 0.88 |
| 10. Korea | 0.89 | 0.89 | 0.91 | 0.89 | 0.90 | 0.89 | 0.89 | 0.86 | 0.92 | 0.95 | 0.90 | 0.89 | 0.92 | 0.92 |
| 11. Poland | 0.93 | 0.90 | 0.90 | 0.88 | 0.93 | 0.95 | 0.89 | 0.83 | 0.92 | 0.91 | 0.93 | 0.91 | 0.93 | 0.89 |
| 12. Russia | 0.92 | 0.92 | 0.85 | 0.89 | 0.93 | 0.90 | 0.92 | 0.85 | 0.91 | 0.90 | 0.92 | 0.93 | 0.93 | 0.89 |
| 13. USA | 0.96 | 0.94 | 0.86 | 0.89 | 0.93 | 0.94 | 0.98 | 0.83 | 0.90 | 0.91 | 0.92 | 0.92 | 0.89 | 0.93 |
| 14. Zimbabwe | 0.91 | 0.90 | 0.88 | 0.92 | 0.90 | 0.89 | 0.92 | 0.88 | 0.89 | 0.92 | 0.89 | 0.91 | 0.93 | 0.92 |

Note: Cross-national correlations between the averaged impact of each personal characteristic on men's status are presented beneath the diagonal; Cross-national correlations between the averaged impact of each personal characteristic on women's status is presented above the diagonal. Correlations between the averaged impacts of personal characteristics on men's and women's status within each country are presented on the diagonal. All correlations are significant, $p < .001$.

Table 2

Item-level correlations between country- and sex-specific status impact ratings and American pride and shame.

| Country-specific status impacts (n items) | American women | | American men | |
|---|------------------|------------------|------------------|------------------|
| | Forecasted pride | Forecasted shame | Forecasted pride | Forecasted shame |
| USA (240) | 0.94 | -0.88 | 0.93 | -0.84 |
| Brazil (240) | 0.90 | -0.83 | 0.90 | -0.81 |
| Colombia (240) | 0.91 | -0.85 | 0.91 | -0.81 |
| China (169) | 0.86 | -0.78 | 0.82 | -0.74 |
| Eritrea (227) | 0.91 | -0.80 | 0.91 | -0.77 |
| Estonia (220) | 0.89 | -0.84 | 0.92 | -0.82 |
| Germany (170) | 0.91 | -0.85 | 0.91 | -0.82 |
| Guam (211) | 0.93 | -0.88 | 0.92 | -0.83 |
| Romania (240) | 0.84 | -0.76 | 0.85 | -0.75 |
| Japan (240) | 0.88 | -0.84 | 0.88 | -0.81 |
| Korea (240) | 0.91 | -0.83 | 0.90 | -0.80 |
| Poland (172) | 0.90 | -0.86 | 0.91 | -0.82 |
| Russia (220) | 0.90 | -0.84 | 0.91 | -0.81 |
| Zimbabwe (240) | 0.91 | -0.82 | 0.92 | -0.80 |
| Mean r | 0.90 | -0.83 | 0.90 | -0.80 |
| SD | 0.02 | 0.03 | 0.03 | 0.03 |

Note: All correlations statistically significant at $p < .001$.

3.2. Do pride and shame intensities universally track status impacts?

After aggregating forecasts of pride and shame for each item by sex (ICCs ranged from 0.87 to 0.98), we computed the sex-specific correlations between averaged pride and shame forecasts and the averaged status-impact of each item in each of the 14 countries. As shown in Table 2, the sex-specific averaged pride and shame ratings for each item were strongly correlated in the predicted directions with the respective averaged status-impact ratings from each country.

3.3. Do pride and shame intensities associate nonlinearly with the status gain-loss continuum?

We used the R packages lme4 and lmerTest (Bates, Maechler, Bolker, & Walker, 2015; Kuznetsova, Brockhoff, & Christensen, 2017) to

build a cross-classified multilevel model where ratings of pride and shame were crossed between individual participants and items. To include pride and shame as the response variables, we stacked ratings of pride and shame into one variable (*Emotion Level*) and created a dummy-variable indicating whether the ratings were of pride or shame (*Emotion Type*). Within the crossed structure, we estimated a maximal model as recommended by Barr, Levy, Scheepers, and Tily (2013) with random intercepts and random slopes for the sex-specific effect of an item's status impact on forecasts of pride and shame at pre-specified intervals of status-impact (i.e., between -4 and -2 = *Large Status Decrease*; between -2 and 0 = *Small Status Decrease*; between 0 and $+2$ = *Small Status Increase*; between $+2$ and $+4$ = *Large Status Increase*) by including the emotion type, status-interval classification and rater's sex as interaction terms in the model.

The effect of status on pride and shame differed by status-impact interval and sex of the rater: the model estimating slopes at pre-specified intervals fit the data better than a linear model [χ^2_{diff} (24) = 209.94, $p < .001$] and a quadratic model [χ^2_{diff} (20) = 87.42, $p < .001$]. Higher-order interaction terms revealed a significant three-way interaction between emotion type (i.e., pride or shame), rater-sex, and status-interval, indicating that the effect of status on pride and shame differed according to status-impact interval and whether the rater was a man or woman. This supports our prediction that pride and shame exhibit differential non-linear relationships with the status gain-loss continuum.

We decomposed this interaction to examine the relative steepness between pride and shame slopes at each status interval separately for men and women. To do so, we reverse-coded ratings of shame to test for significant differences in relative steepness between pride and shame slopes at each status interval. (The decision of which emotion to reverse-code is arbitrary; Reverse-coding pride ratings yields identical results.)

We then examined the simple slopes of pride and shame at each status interval for men and women. Fig. 1 depicts the results of the emotion-specific simple slopes analysis for each status interval (plots showing the same general patterns using status ratings from the 13 additional countries are provided in the Supplemental Materials).

Statistical examination of simple slopes showed that men's overall slope for pride was not statistically different from zero for large status decreases ($b = 0.31$, $p = .157$) and women's overall pride slope was ($b = 0.42$, $p = .006$). Similarly, men's overall shame slope was not statistically associated with large status increases ($b = -0.02$, $p = .663$) and women's overall shame slope was ($b = -0.25$, $p = .003$). Tests of the difference in slope steepness showed that, for both men and women, shame slopes were significantly steeper than the pride slopes for large status decreases ($ps < 0.01$) and that pride slopes were significantly steeper than shame slopes for large status increases ($ps < 0.001$).

For the intervals of small status increases and small status decreases both men's and women's overall pride and shame slopes were statistically different from zero ($ps < 0.001$). The interaction tests of relative slope steepness show that men's and women's pride slopes were significantly steeper than shame slopes for small status increases ($ps < 0.001$). For small status decreases, pride and shame slopes did not statistically differ in steepness for men ($p = .652$) or women ($p = .220$).

4. Discussion

The adaptationist accounts tested in the current study hypothesize (1) the existence of a universal grammar of social valuation, and (2) that the emotions of pride and shame are evolved programs that track and manage social valuation. We tested multiple predictions to extend these hypotheses to the domain of hierarchical status using a large cross-national dataset on the status impacts of personal characteristics.

4.1. Cross-cultural universality in status criteria

The differing status impacts of a broad range of personal characteristics were strongly correlated across 14 nations, providing compelling support for the existence of a universal grammar of status allocation. These findings are remarkable: specific acts and traits have nearly identical impacts on the level of hierarchical status people afford to others across cultures—whether east or west, collectivistic or individualistic, urban or rural, rich or poor. Although some status allocation criteria are variable across societies, our data suggest that the overall picture is species-typical universality.

4.2. Status criteria are closely tracked by pride and shame

Past research has primarily studied the experience of shame and pride, and how the outputs of each might facilitate status-management, but less is known about the full range of specific cues that serve as activating inputs to the system. As one example, compelling evidence suggests that pride and shame are elicited by victories and losses in sport competition (Tracy & Matsumoto, 2008); however, these are only one potential class of elicitors of pride and shame. Recent cross-cultural studies of industrialized and small-scale societies showing that the degree to which personal characteristics elicited pride or shame in subjects closely tracked the degree to which those same characteristics were independently judged to be socially positive or negative (Sznycer et al., 2017, 2016; Sznycer, Xygalatas, Agey, et al., 2018; Sznycer, Xygalatas, Alami, et al., 2018) highlights changes in social value as another broad class of elicitors. However, no previous research has specifically documented that pride and shame are reliably elicited by the narrower range of acts, characteristics, and events that increase and decrease hierarchical status in direct proportion to the impact they have on one's status in the eyes of others. Although similar, status criteria are not likely isomorphic with the criteria employed to compute others' social value. In the following section, we clarify our conceptualization of the relationship between social status and social value.

4.3. Status criteria as components of a universal grammar of social valuation

The hypothesized existence of universal status criteria is a special case of a broader hypothesis: the existence of a universal grammar of social valuation (Buss et al., 1990; Sznycer et al., 2016). Novel adaptive challenges arose with the evolution of our unique degree of dependence upon various forms of mutual aid within crosscutting cooperative relationships and groups (Buss & Schmitt, 2019; Kaplan, Hill, Lancaster, & Hurtado, 2000; Tooby & Cosmides, 1996). Against this backdrop of fitness interdependence, other people had intrinsic value to the individual and could conditionally value the individual based on their probable contributions to the valuer's fitness. It therefore would have been functionally imperative to estimate the value of the self to others, and of others to the self (Sznycer & Lukaszewski, 2019).

By hypothesis, an evolved grammar of social valuation would assign social value to others by computing cue-based estimates of the extent to which the specific acts and traits exhibited by an actual or potential associate would produce net increases or decreases in one's own fitness. To accomplish these computations, this grammar must contain a catalogue of acts and traits, and it must associate these acts and traits with specific valuation weights, which run from positive (highly valued) to negative (highly disvalued). Many of these weights may be relatively invariant features of the valuation grammar, such as good health; others may be open parameters calibrated across ontogeny based on local imperatives, such as skill in culture-specific tasks.

Copious evidence supports the predictions arising from this general hypothesis. For example, assessments of others' social value as a coalition member are regulated by cue-based inferences regarding their internal valuation of the coalition (Delton & Robertson, 2012);

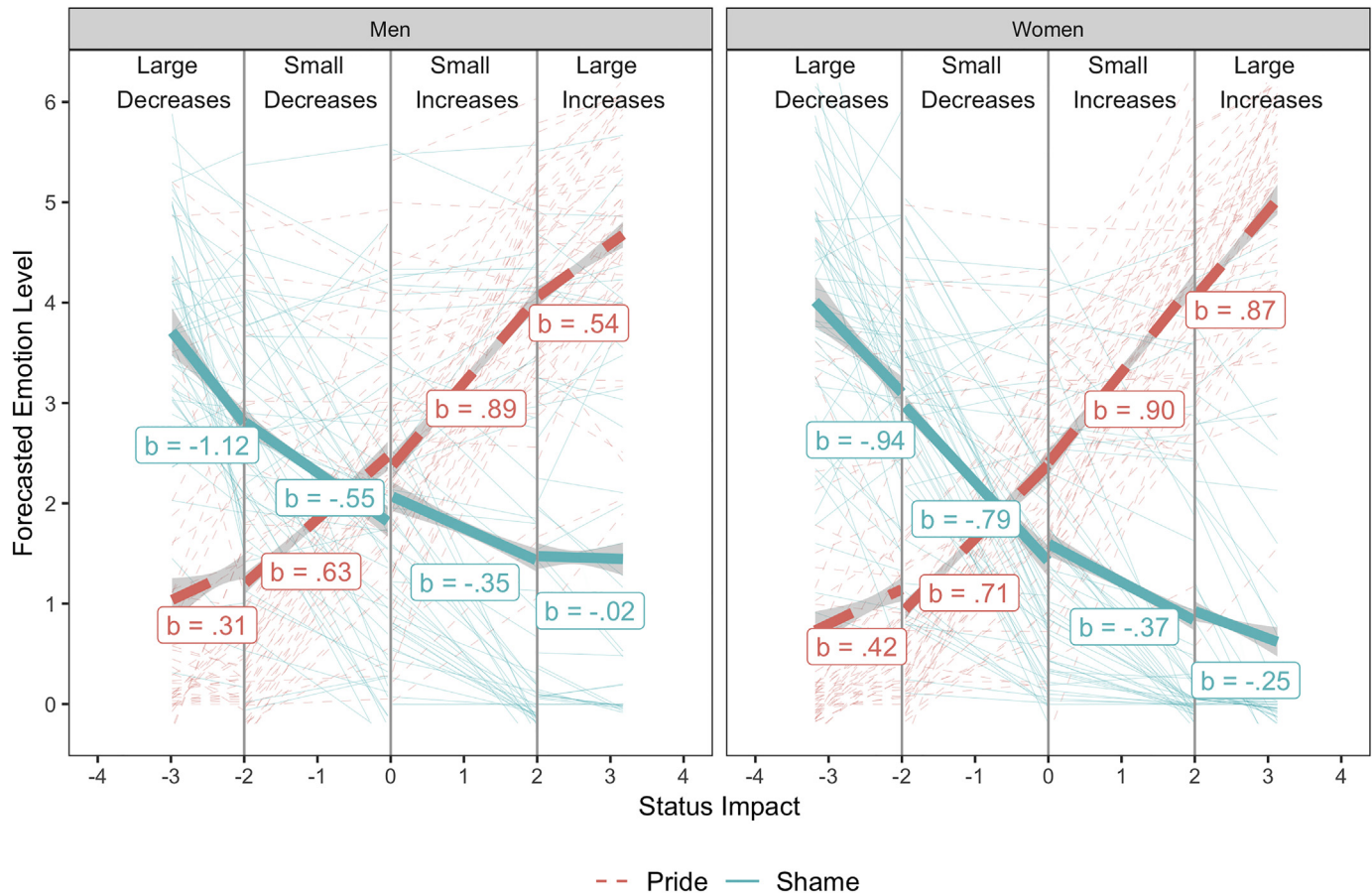


Fig. 1. Sex-faceted plot of the multilevel model depicting individual slopes and the overall simple slopes of status impact on American forecasts of pride and shame at each interval of status.

assessments of others' social value as a same-sex cooperative partner are regulated by cue-based assessments of their productivity and generosity (Eisenbruch, Grillot, Maestriperieri, & Roney, 2016); assessments of women's residual reproductive value are regulated by cue-based estimates of youth and low parity (Andrews, Lukaszewski, Simmons, & Bleske-Rechek, 2017; Lassek & Gaulin, 2019); assessments of partners in deep engagement relationships (e.g., close friends, long-term mates) are regulated by cue-based estimates of their self-directed dependability and trustworthiness (Buss & Schmitt, 2019; Lukaszewski & Roney, 2010); assessments of another's value as a recipient of need-based generosity depend on cue-based estimates of their genetic relatedness to self (Lieberman, Tooby, & Cosmides, 2007); and assessments of others' value as a leader are regulated by cue-based estimates of their ability and willingness to solve collective action problems (Lukaszewski et al., 2016). The premise that the human grammar of social valuation contains many directionally fixed valuation weights attached to specific characteristics is further supported by large cross-cultural agreement across both large- and small-scale societies in the extent to which diverse sets of specific characteristics are socially valued and disvalued, whether in general (Sznycer et al., 2016), in specific types of relationships (Buss et al., 1990), or in domains of moral judgment (Curry, Chesters, & Van Lissa, 2019). The present study extends the evidence for cultural universality of social valuation to the status domain.

The social valuation weights attached to specific acts and traits will correlate—albeit imperfectly—across distinct relationship categories, such that the characteristics that are valued in a friend will also be valued in mates, kin, coalition members, and leaders (Eisenbruch et al., 2016; Sugiyama, 2015). This relationship-generalizability owes, in part, to the fact that the some of the same characteristics determine one's ability to generate benefits for different types of relationship partners. For

instance, resources generated via skilled hunting could be shared with any type of relationship partner, and physical strength, health, or attractiveness could be useful for bargaining across many different relationships. Within an interdependent social world, an individual's value in a given type of relationship is a *determinant* of one's value in many other types of relationships.

The weights attached to the characteristics used to compute an individual's status therefore almost certainly overlap with, and are influenced by, those that determine one's value in other relationship domains. Within a service-for-prestige system of status determination, services considered status-worthy are those that increase the net payoffs of n-person cooperation in coalitions and communities (i.e., leadership services, Garfield, Hubbard, & Hagen, 2019; Kyl-Heku & Buss, 1996; Patton, 2000; Price & Van Vugt, 2014; von Rueden, Gurven, Kaplan, & Stieglitz, 2014). Examples of such status-worthy services include both formidability- and alliance-dependent functions, such as eliciting positive contributions from group members (Lukaszewski et al., 2016; von Rueden et al., 2014) and serving in warfare and group defense (Patton, 2000). However, *computational services* are likely even more important in determining one's ability to generate collective benefits through leadership (sensu Garfield et al., 2019), such as recognizing and communicating n-person opportunities for collective action (sensu Garfield et al., 2019), and thereby solving the adaptive problem of meta-coordination—determining not just *how* to coordinate, but *what to coordinate about* (Hagen & Garfield, 2019; Pietraszewski, 2019).

Another important difference between status valuation and other forms of relationship-specific valuation is the finiteness of the benefits that the valued individual generates for others. Within dyadic relationships, each person's intrinsic valuation regulates their willingness to sacrifice for the other (Delton & Robertson, 2016). Moreover, within

close dyadic relationships such as pair bonds and friendship alliances, each person's valuation of the other trades off against their valuation of all others in the social environment. This is because people have a limited number of 'slots' for close relationship partners, who are intrinsically valuable in the long-run because they can be counted on to aid the self in occasional times of need such as illness or physical incapacitation (Sugiyama & Sugiyama, 2003; Tooby & Cosmides, 1996). According to the alliance hypothesis, one of the primary valued benefits of having close allies is allegiance—a commitment to take one's side in conflicts of interest with others (DeScioli & Kurzban, 2009). Thus, the benefits of close dyadic relationships flow primarily within those dyads, and trade off against either individual's ability to generate benefits for others.

Importantly, none of this holds within a service-for-prestige system of status allocation. Here, leadership services being rendered are about improving n-person cooperation—which, by definition, generates net collective benefits for most or all individuals involved. There is no tradeoff between providing such services to one group member and providing them to another. The benefit that group members reciprocally generate for leaders is increased hierarchical status, which brings various privileges (e.g., relaxed non-leadership obligations), prerogatives (e.g., to influence collective decisions in ways that subtly benefit the leader's self-interest), and deference from others when interests conflict (Price & Van Vugt, 2014; von Rueden et al., 2008, 2014).

The human grammar of social valuation is expected to attach positive or negative weights to the personal characteristics that define one's entitlement to a given level of hierarchical status that overlap with those it uses to compute one's value in other relationship domains (e.g., close friend, mate, coalition member). However, the exact weights attached to these characteristics are also expected to shift quantitatively across relationship domains in relation to the function of each relationship type. For instance, it would be beneficial for one's closest friend to be in the 99th percentile in the computational services that make a superlative leader in n-person contexts. Importantly, though, the grammar of social valuation would be poorly designed if it weighed a friend's ability to provide such benefits more heavily than their intrinsic valuation of oneself when making tradeoffs among investments in specific individuals (Tooby & Cosmides, 1996). In the domain of hierarchical status, the opposite relative priorities would be more functional: benefit-generation abilities should be weighted more heavily than the individual's intrinsic valuation of any specific person in the group.

Previous studies have demonstrated that pride and shame universally track general judgments of social positivity and negativity (e.g., Sznycer et al., 2017, 2016), and the current study reported similar results in relation to the full breadth of the status gain-loss continuum. Here, associations of both pride and shame intensities with status impacts were somewhat larger than typically found in relation to general social valuations. The activation thresholds of pride and shame may therefore be more strongly attuned to gains and losses in status than they are to social valuation and devaluation in other relationship domains. Although this suggestion is consistent with the proposed phylogenetic origins of pride and shame as signals of dominance and deference in hierarchical contexts (Chapais, 2015; Fessler, 2007; Gilbert, 2000; Tracy et al., 2010), focused cross-cultural research will be required to examine the relationship-specificity of both the valuation weights attached to specific characteristics and the input criteria of pride and shame.

4.4. The distinctness of pride and shame

Our findings provide the first explicit, albeit inconclusive, evidence that pride and shame function as *computationally distinct* components of the human status management system. As predicted, American's forecasts of the pride or shame they would experience if they exhibited

specific personal characteristics closely tracked the status impacts of those same characteristics across 14 nations. However, these relationships were clearly non-linear. Pride intensity tracked status-increasing characteristics much more closely than did shame intensity, whereas shame tracked status-decreasing characteristics more closely than did pride. The parameters of the pride and shame responses were not simply mirror images—the average pride response does not accurately predict shame, and vice versa. Although these effects could reflect methodological artifacts (e.g., ceiling and floor effects), the predicted and observed differential nonlinearities are a necessary—albeit insufficient—precondition for concluding that pride and shame are distinct emotional programs; if pride and shame intensities perfectly predicted one another at all points along the status continuum, this would seem to preclude the possibility of their distinctness.

Further support for the distinctness of the pride and shame programs would be that both can activate simultaneously in response to the same situation. Such co-activation would provide compelling evidence that these emotions are not simply opposite poles of a single emotional continuum. Future research should therefore examine whether the activation of pride precludes the activation of shame and vice-versa; if they are partially distinct emotion programs, then each could be activated to the degree warranted by a given input, and the relative mixture of pride and shame could regulate behavioral responses accordingly. This would be especially important when an audience has somewhat heterogeneous valuations (Sznycer, Xygalatas, Agey, et al., 2018; Sznycer, 2018). For example, the impacts of aggression, clothing choice, or conspicuous consumption, could simultaneously activate different amounts of both pride and shame because each might increase your status in the eyes of some others, but decrease it in the eyes of different others. Such situations could therefore simultaneously activate pride and shame in different proportions—and lead to outputs designed to manage one's value to others in audience-specific ways.

4.5. Cross-cultural invariance

The fact that pride and shame ratings came from a single country does not permit unequivocal generalization to other countries. However, extant studies using similar methods compellingly demonstrate that the associations of these emotions with social valuation are culturally invariant. Across both industrialized and small-scale societies, pride (Sznycer et al., 2017; Sznycer, Xygalatas, Alami, et al., 2018) and shame (Sznycer et al., 2016; Sznycer, Xygalatas, Agey, et al., 2018) track judgments of social value similarly within and between societies. In the current study, pride and shame tracked cross-national status impacts even more strongly than they tracked general social valuations in those prior studies, so it would be surprising if the status-emotion relationships were not likewise invariant.

Importantly, the hypothesized invariance of the function of these emotions does not necessarily require that status impacts themselves are invariant across cultures, but that the events that do have similar status impacts activate similar magnitudes of pride and shame. To the extent that status impacts of any characteristics are similar across cultures, pride and shame will be activated similarly in response to those characteristics. That is, the variability should be mostly in the specifics of the inputs, not in how the emotional responses track the inputs across cultures. More focused cross-cultural research is certainly needed to test these invariances, and whether status impacts more are tracked more strongly than social value in some cultures (e.g., those with especially steep hierarchies or limited social mobility) than others.

4.6. Emotional forecasts vs. emotional reactions

One limitation of the approach to studying emotions employed here and in other social-emotion research is that emotional forecasts—rather than emotion reactions—are used to test the activating conditions of emotions. This might limit the real-world applicability of conclusions

from this research to manifest emotional reactions. However, it is a theoretical prediction that, in order to promote maximization of status gains and avoidance of status losses, pride and shame must operate prospectively, by forecasting the intensity with which they would activate if certain decisions were taken, and guiding behavior accordingly (Sznycer & Lukaszewski, 2019). The current methodology that relies on forecasts of emotion responses is appropriate to test the focal emotion programs' prospective modes of operation. Of course, the fact that social emotions operate prospectively does not preclude the importance of studying their activation in reaction to status-increasing or status-decreasing events. Such research will be important for establishing the generalizability of the present findings to pride and shame's reactive modes of operation.

5. Conclusion

In sum, the current study provides evidence for the species-typicality of multiple components of an evolved psychological system for status management. The desire for status has recently been established as a human universal (Anderson et al., 2015). Our findings reveal that the criteria by which humans allocate this universally-desired social resource are likewise species-typical, and bolster existing evidence supporting the functional roles of pride and shame in managing one's status in the minds of others.

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Declaration of Competing Interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.evolhumbehav.2019.06.004>. Data and code available at <https://osf.io/m84re/>.

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